

REMARKS

Claim Status

Applicants acknowledge, with appreciation, the allowance of claims 21 and 22, and the indication that claims 5, 6, and 14 contain allowable subject matter. Claims 1, 4-16 and 18-23 are presented for examination in unamended form, with claims 1, 21, 22 and 23 being the only independent claims. No new matter has been added. Reconsideration of the application is respectfully requested.

Overview of the Office Action

Claim 23 stands rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,676,174 (“*Sekiya*”), while claims 1, 4, 7, 11-14, 16, 19 and 20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Sekiya* in view of U.S. Patent Publication 2003/0231234 (“*Ushirogouchi*”).

Claims 8 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Sekiya* in view of *Ushirogouchi*, and further in view of EP 0 307 251 (“*Tasaki*”).

Claims 10 and 15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Sekiya* in view of *Ushirogouchi*, and further in view of U.S. Patent No. 5,287,123 (“*Medin*”).

Claim 18 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Sekiya* in view of *Ushirogouchi*, and further in view of U.S. Patent No. 6,619,777 (“*Chang*”).

Applicants have carefully considered the Examiner’s rejections, and the comments provided in support thereof, and respectfully disagree with the Examiner’s analysis. For the reasons which follow, it is respectfully submitted that all claims of the present application are patentable over the cited references.

Patentability of the Claims under 35 U.S.C. §102 and §103

As fully argued in the previously filed Amendment (which the Examiner is respectfully requested to reconsider), in accordance with the claimed invention, when a cationic polymerization type of ink is used, it is particularly important for facilitating the curability of such ink with UV light that the temperature of the received ink be controlled to a given temperature range before the ink is radiated by the UV light. Accordingly, by controlling the temperature of the recording medium within a preset target temperature range before the cationic ink is received on the recording medium, the pre-heated recording medium brings the cationic ink once it is received on the recording medium to a selected temperature that facilitates its curing with UV light. As a result, when the active energy ray irradiates the ink on the medium, the curability of the cationic ink will have been raised.

The Examiner concedes that *Sekiya* fails to teach the claimed invention of an inkjet recording apparatus, wherein the ink has cationic polymerization characteristics. However, independent claim 1 is patentable for reason beyond the failure of *Sekiya* to teach the foregoing limitation. For example, *Sekiya* (col. 2, lines 15-17) states that “it is possible to prevent an image printed on the recording medium thereby from [being] degraded even before the image has not been dried sufficiently”. *Sekiya* (col. 2, lines 18-21) further states that the “recording medium used there may preferably comprise a coating paper having a material coated on a base material such that the ink adhering thereto is easy to be absorbed thereinto”. Lastly, *Sekiya* (col. 2, lines 22-26) states that “the image printed is easy to be dried, and, thus, even the thus-obtained printed matters are stacked in a condition in which they are stacked on each other, each image on the printing surface can be prevented from penetrating to the rear surface or from being degraded”. *Sekiya* clearly teaches an invention in which ink is absorbed in paper and the image on the

printed surface dries quickly. *Sekiya* discloses an invention that relates to a conventional, old and well-known inkjet system for water-based ink. This system, however, is not an inkjet recording medium for UV curable ink. Consequently, *Sekiya* fails to teach or suggest the UV curable ink composition of the claimed invention. *Sekiya* thus fails to teach or suggest the claimed invention recited in independent claims 1 and 23 and, as explained below, the elements disclosed in *Sekiya* are fundamentally incompatible with the elements recited in the independent claims of the present invention.

The Examiner (pgs. 2 and 3) of the Office Action contends that:

Sekiya discloses ... an active energy/ultraviolet ray radiation section for radiating an active energy/ultraviolet ray (halogen lamp) to the ink jetted on the recording medium to cure the ink (elements: 76, 84, figure: 5 and 7-9)....

Sekiya (col. 9, line 22, et seq.) teaches that element 84 is a halogen heater and that element 76 is a heating-type ink fixing device. This is different from the claimed active energy ray radiation section for curing UV curable ink by radiation of UV light. *Sekiya* teaches that the printing surface is merely dried by the heat ray radiating from the halogen heater, thereby facilitating the drying of ink and improving the ink fixing speed (see col. 9, lines 50-54).

Moreover, the halogen heater of *Sekiya* serves to radiate a heat ray, and even if such a heat ray contains a small amount of UV light, this low UV level would be insufficient to cure a UV curable ink in the manner defined in independent claims 1 and 23.

The Examiner (pgs. 2 and 3) of the Office Action contends that:

Sekiya discloses ... a temperature controlling mechanism for controlling the temperature of the recording medium which is carried by the carrying section within a preset target temperature range before the jetted ink received on the recording medium (element: 87, figure: 7-9)....

Contrary to the Examiner's assertion, however, the rear heating unit 87 of *Sekiya* serves

to simply assist drying of the ink by also applying heat from the rear face of the conveyance belt

40. Unlike the claimed invention, *Sekiya* fails to teach or suggest controlling the temperature of a base material within a preset temperature range after a UV curable ink is received on the base material in order for the ink to reach a preset target temperature before the UV light is received on the recording medium to be radiated. The claimed invention utilized UV light curable ink. As a result, there is a need to maintain the base material at a preset temperature range in advance to permit efficient curing of the ink. In contrast, *Sekiya* teaches a method that is completely different to what Applicants have disclosed and claim, because *Sekiya* applies heat simply to dry the ink. In view of the foregoing, independent claims 1 and 23 are neither anticipated nor rendered obvious by *Sekiya*.

Furthermore, it would not have been obvious to the skilled person to combine the teachings of *Sekiya* with any one of the other cited references. As a result, all claims of the present application are patentable over the combination of the cited references.

Ushirogouchi relates to “an ink jet recording apparatus that permits obtaining a printed material by using a liquid ink” and to providing “a liquid ink that eliminates the need to use an organic solvent and a bulky light exposure system in order to obtain a high quality print” (see paragraph [0016] to [0017]. *Ushirogouchi* fails to disclose “controlling the temperature of the recording medium which is carried by the carrying section within a preset target temperature range, before the jetted ink is received on the recording medium,” as recited in independent claim 1. The embodiments depicted in FIGS. 1, 10 and 11 of *Ushirogouchi* are the only ones that show use of a heater 6. In FIG. 1, heater 6 is arranged downstream of the recording head 4 in the feeding direction of the recording medium 2. Consequently, the temperature of the recording medium 2

is controlled only after the jetted ink is received on the recording medium by the recording head 4.

FIG. 10 discloses an image carrier in the form of drum 18a which transfers the image to the recording medium 2 at transfer roller 19. Recording head 4 spouts ink unto drum 18a. Rotation of drum 18a then brings the ink around to heater 6. Thus, the temperature of drum 18a is controlled after the ink is applied to drum 18a.

FIG. 11 discloses an image carrier in the form of belt 18b which transfers the image to the recording medium 2 at transfer roller 19. For our present purposes, the arrangement of belt 18b is similar to drum 18a in that the heater 6 controls the temperature of belt 18b after the ink is applied to belt 18b.

Therefore, *Ushirogouchi* fails to teach a “temperature controlling mechanism for controlling the temperature of the recording medium which is carried by the carrying section within a preset target temperature range,” and that the temperature is controlled “before the jetted ink is received on the recording medium.”

Medin discloses “a color ink-jet printer having a heating blower system for evaporating ink carriers from the print medium after ink-jet printing” (see *Abstract*). *Medin* fails to cure the deficiency of the system achieved by the combination of *Sekiya* and/or *Ushirogouchi*. Specifically, *Medin* also fails to teach or suggest the temperature controlling mechanism recited in independent claims 1 and 23.

Chang discloses “a liquid jet apparatus and method for ejecting liquid drops of a plurality of kinds different in volume from the same nozzle opening” (see col. 1, lines 7-10). *Chang* fails to cure the deficiency of the system achieved by the combination of *Sekiya*, *Ushirogouchi* and/or

Medin. Specifically, *Chang* also fails to teach or suggest the temperature controlling mechanism recited in independent claims 1 and 23.

Tasaki discloses an ink jet recording apparatus that is provided with a fixing heater for accelerating the fixation of ink deposited on a recording medium (see pg. 2, lines 8-10). However, the combination of *Sekiya*, *Ushirogouchi*, *Medin* and/ or *Chang* would still fail to achieve the system of the claimed invention, since *Tasaki* also fails to teach or suggest an ink jet recording apparatus having both an ultraviolet radiation section and a temperature controlling mechanism, as recited in independent claim 1.

Moreover, the present inventors have determined that curing an ultraviolet ray curable ink (e.g., cationic polymerization ink) also depends upon the humidity, and that it is difficult to cure the ultraviolet ray curable ink at high levels of humidity. Dependent claims 8 and 9 are directed to providing a humidity detecting section for detecting humidity around the recording medium. *Tasaki* fails to teach or suggest that the curing of the ultraviolet ray curable ink depends upon the humidity, and that it is difficult to cure the ultraviolet ray curable ink at high humidity. Accordingly, dependent claims 8 and 9 are patentable for this additional reason.

In view of the foregoing, independent claims 1 and 23 are patentable over *Sekiya*, either individually or in combination with *Ushirogouchi*, *Medin*, *Chang* and/or *Tasaki*. Consequently, reconsideration and withdrawal of all the rejections under 35 U.S.C. 35 U.S.C. 102 and §103 are in order, and a notice to that effect is requested.

Dependent claims

In view of the patentability of independent claims 1 and 21-23, for the reasons presented above, each of dependent claims 4-16 and 18-20 is patentable therewith over the prior art.

Moreover, each of these claims includes features which serve to even more clearly distinguish the invention over the applied references.

Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited.

Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

It is believed that no fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,
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